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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/721,264	11/21/2000	Daryl J. Pocker	SJO990197US1	3418

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INTELLECTUAL PROPERTY LAW OFFICE
1901 S. BASCOM AVENUE, SUITE 660
CAMPBELL, CA 95008

EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	PAPER NUMBER
1762	9

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/721,264	Pocker et al
Examiner	**Group Art Unit**
M.L. Padgett	1762

—Th MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 11/4/02 (10/28/02) + 11/26/02.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-26 is/are pending in the application.

Of the above claim(s) 1-12 is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 13-26 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

☒ Information Disclosure Stat ment(s), PTO-1449, Paper No(s). 3

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Int rview Summary, PTO-413

☐ Notice of Inf rmal Patent Application, PTO-152

☐ Other _____

Office Action Summary

1. Applicant's election without traverse of Group II, method claims 13-26 in Paper No. 6 is acknowledged.

2. Claims 13-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, "an initial thickness DLC layer portion" in line 4 has no clear relationship to "a diamond-like carbon (DLC) layer" of line 3, but both limitations introduced as different things are fabricated upon the magnetic layer without any clear differentiation or relation of where there upon they are.

Also, use of relative terms that lack clear metes and bounds in the claim, in a definition in the specification or in cited relevant prior art, are vague and indefinite. See "hard" in all the preambles, and see "low" in line 5 and "high" in line 7 of claim 13, which modify "carbon ion beam energy". Also, see "mid-range" in claim 16. Note page 1 of the specification gives a value in parenthesis (~10eV) for generally low energy, but as this does not agree with the ranges supplied by dependent claim 14, and does not provide a definition to clarify this issue. (If it was the same, and considered a definition, then claim 14 would not further limit.) Further note in claim 22, "low...beam energy" is defined, with "higher..." being described with respect to the low energy.

In claim 17 "said intermediate carbon ion beam energy" lacks antecedent basis due to use of inconsistent terminology with claim 16, which uses "a relatively mid-range carbon ion beam energy".

In claim 22, the clarity or format of the claim could be improved by standardizing use of articles to be consistent with showing proper antecedent basis. Specifically, as "the...energy

level" and "the thickness" are newly introduced in line 8, deletion of the article "the" would be appropriate, while in line 9, insertion of --the-- or --said-- before "carbon ion species" would be consistent with the limitations' prior introduction in line 5.

It is also noted, that while "smoothly" is a relative term, its use in "varied smoothly with time" may be considered to describe how the energy level varies smoothly, especially considered in context and in juxtaposition to claim 24, where it varies as a step function with time, i.e. incrementally.

In claim 20-21 and 25-26, when are the N ions intended to be implanted? Is this a process totally separate from the fabrication of the DLC layers or sublayers, or occurs as part of the fabricating steps or what?

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 13-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Falabella (5,763,087), in view of Ueda et al (5,776,602), optionally in view of Schmidt et al.

Falbella teaches deposition of "amorphous diamond" (α-C is an allotrope of carbon generally considered a form of DLC or diamond like carbon), via carbon ion beams, via a technique that reduces the intrinsic stress of the coating, and are indicated to be useful on magnetic media. Falabella disclose that density, hardness and intrinsic stress levels of α-C depend on ratios of sp^3 to sp^2 bonds, which can be controlled by the incident C ion energy, substrate surface temperature and impurity concentration. Increasing the incident C ion energy is noted to ultimately reduce stress. Nitrogen is also suggested as a dopant for reducing stress. See the abstract; Fig. 1; col. 2, line 15-31, 40-45 and 62 - col. 3, line 61, esp. 23-45; and col. 4,

lines 13-35, noting use of carbon ion beams with 20eV-200 eV energies and that instead on an intermediate layer of metal, carbon may be deposited to form a diffuse interface. On col. 5, lines 1-19 (Ex. 3), 22 eV C ions are of sufficient energy to cause embedding to several mono-layers, and lines 56 - col. 6, lines 16, show increasing mean C ion energy causes reduction of intrinsic stress, comparing N doped and non-doped deposits to show further stress reduction. While Falabella does not explicitly teach the specific sequence of energy use claimed, (10-20ev, then 100eV, high and low etc.), he does specifically suggest "deposition conditions may be varied to provide a range of hardness and stress levels. Moreover, the material for the substrate and intermediate layer may be modified in order to provide better adaptability to various types of applications".

Ueda et al (602) provides teachings specifically directed to magnetic recording media carbon protective coatings, and while the examples therein use sputtering techniques, col. 8, lines 10-13 specifically teaches the equivalence of ion beam deposition and sputtering for the processes Ueda et al (602). Particularly note on col. 4, lines 9-24 and 40-68 the teachings of atomic ratio of N to C of 5-20% and the deposit of plural carbon layers with a gradiant of nitrogen dopant, with a maximum concentration on the upper surface where lubricant is to be deposited. Col. 5, lines 19-25 discuss hardness and density, line 50-52 move [N], with col. 6, lines 1-49 discussing the importance of the graded amount of N, the sp^2 and sp^3 hard structure of the coatings, intrinsic stress, etc., at the interface with the lubricant layer. While Ueda et al has the multilayer teachings and equivalence of ion beam and sputtering to form deposits, they do not have energy variation teaching to produce difference in layer properties, nor specific examples of ion beam usage.

Given the above teachings of Falabella and Ueda et al (602), it would have been obvious to one of ordinary skill in the art, that as Ueda et al shows the desirability of high [N]

and reduced stress at the carbon protective layer/lubricant interface, and that Falabella teaches that with ion deposition both N and energy of deposit effect the stress and sp^2 to sp^3 ratios, that with graded energy usage and [N] would have been expected to have been effective in produces the desired structure for magnetic media as taught by Ueda et al, especially considering Falabella's suggestion of varying their parameters during deposit to effect stress levels, and Ueda et al equivalence teachings for ion beam and sputtering.

Optionally, Schmidt et al (abstract;; Fig. 1, 3; col. 6; col. 9, lines 8-50 and table 1 on col. 7-8) is cumulative too the above teachings, where "primary" ion beam deposition may be used, providing suggestions of multiple layers, abrupt or graded, where initial deposit is for adhesion and softer (thus may use lower energy beam), followed by harder layer(s) on which lubricant is deposited. Therefore, it would have been further obvious to employ the technique of Falabella using initially lower energies for the ion beam deposition to provide for improved adhesion with the substrate as suggested by Schmidt et al, especially as this is consistent with Falabella's teaching of taking steps for adhesion purposes (intermediate or different layer).

5. Other art of interest includes Martin et al with further DLC deposition teachings, with ion beam usage as alternative, and their discussion of DLC in col. 1-2, include the amorphous "diamond" of Falbella.

6. Any inquiry concerning this communication should be directed to M. L. Padgett at telephone number (703) 308-2336 on M-F from about 8:30 a.m. to 4:30 p.m.; and FX (703) 872-9310 (regular); 872-9311 (after final); or 305-6078 (informal).

MARIANNE PADGETT
PRIMARY EXAMINER

M.L. Padgett/dh 3/11/03

March 26, 2003